



The Monarch Cement Company

449 1200 Street · PO Box 1000 · Humboldt, KS 66748
 Phone: 620-473-2222 · Fax: 620-473-2447

Certified Mill Test Report - Type I/II

Production Period: December 1- December 31, 2017

Silo (Bin) No. 682

The following is based on average test data during the production period. The data is typical of cement produced at The Monarch Cement Company, Humboldt, KS. Individual shipments may vary.

PHYSICAL

	Reported	Spec Limit		Reported	Spec Limit
325 Sieve, % Passing	94.5	-	Air Content of Mortar (volume %)	8.5	12.0 max
Blaine fineness, specific surface			Autoclave Expansion (%)	-0.01	0.80 max
Air Permeability (cm ² /g)	3660	2600 min	Compressive Strength (psi)		
Time of Setting, Gilmore test:			1 Day	1950	-
Initial (hrs:min)	2:40	60 min	3 Days	3370	1740 min
Final (hrs:min)	3:50	600 max	7 Days	4260	2760 min

CHEMICAL

	Reported	Spec Limit		Reported	Spec Limit
SiO ₂ - Silicon dioxide (%)	21.33	-	Loss on ignition (%)	2.00	3.0 max
Fe ₂ O ₃ - Ferric oxide (%)	2.96	6.0 max	Insoluble residue (%)	0.39	1.50 max
Al ₂ O ₃ - Aluminum oxide (%)	4.41	6.0 max	Free lime (%)	0.96	-
CaO - Calcium oxide (%)	64.83	-	Na ₂ O - Sodium oxide (%)	0.20	-
MgO - Magnesium oxide (%)	1.56	6.0 max	K ₂ O - Potassium oxide (%)	0.53	-
SO ₃ - Sulphur trioxide (%)	2.8	3.0 max	Equivalent Alkalies (%)	0.55	0.60 max
			Inorganic Processing Addition (%)	2.10	5.0 max

POTENTIAL CALCULATED COMPOUNDS

C ₃ S - Tricalcium silicate (%)	60.0	-
C ₂ S - Dicalcium silicate (%)	15.9	-
C ₃ A - Tricalcium aluminate (%)	6.7	8 max
C ₄ AF - Tetracalcium aluminoferrite (%)	9.0	-

INORGANIC PROCESS ADDITON (C150)

Process Dust (%)	2.10
SiO ₂ - Silicon dioxide (%)	10.3
Fe ₂ O ₃ - Ferric oxide (%)	2.16
Al ₂ O ₃ - Aluminum oxide (%)	4.23
CaO - Calcium oxide (%)	43.8
SO ₃ - Sulphur trioxide (%)	0.46

The cement in this shipment meets standard requirements in the current specifications of the Federal Government and the American Society for Testing and Materials for Type I and for Type II Portland Cement. Also as prescribed by the Highway Division of the Iowa DOT. All tests conform to ASTM Test Methods: Chemical C-114, Blaine C-204, Soundness C-151, Gillmore C-266, Compressive Strength C-109, Air Content C-185, C-465 and C-150.

Date: 1/18/2018

Sean D. Bowman
 Quality Control Supervisor